

Appln. No. 10/067,978  
Amdt. dated Jan. 20, 2004  
Reply to Office Action of Oct. 22, 2003

### **REMARKS/ARGUMENTS**

In the specification, the paragraphs beginning on and page 12, lines 3 and 7; page 19, line 9; page 29, line 3; and page 32, line 4, have been amended to correct a minor editorial matter.

Claims 1-28, 37-40, 42, and 44-57 remain in this application. Claims 29-36, 41 and 43 have been canceled. Claims 1 and 27 have been amended. Claims 50-57 have been added.

Regarding the amended claims, claim 1 has been amended based on the descriptions, such as provided at page 16, lines 12-17 of the instant specification. A minor editorial change has been made in claim 27. New claims 50 and 51 are based on the original disclosure at page 14, line 7 of the instant specification. New claims 52-54 are based on the original disclosures at page 13, lines 3-5; page 14, lines 7-10; and pages 31-32 (Table 1, oil samples 11, 12, 20, 21, 29, 30, 38, 39) of the instant specification. New claim 55 is based on the original disclosure at page 4, lines 13-16 and page 5, lines 4-9 of the instant specification. New claim 56 is based, for example, on the original disclosure at page 29, lines 3-10 and page 32, line 4 to page 33, line 4 of the instant specification. New claim 57 also is based is based on the disclosure at page 14, line 7. No new matter has been introduced.

### **Response to Anticipation Rejection**

Claims 29 to 37, 41 and 43 have been rejected under 35 U.S.C. 102(b) by U.S. Pat. No. 5,698,498 to Luciani et al.

Applicant points out that original claim 37 depends from claim 26, not claim 29. Claim 26 was not included under this rejection. Applicant therefore presumes that the inclusion of its dependent claim 37 under this rejection was inadvertent, and it is non-applicable. Otherwise, this rejection is rendered moot in view of the cancellation of the other rejected claims 29 to 36, 41 and 43. Therefore, this rejection should be withdrawn.

**Response to Obviousness Rejection**

Claims 1 to 28, 38-40, 42, and 44 to 49 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 5,698,498 to Luciani et al. combined with U.S. Pat. No. 4,846,983 to Ward, Jr. or U.S. Pat. No. 3,578,690 to Becker or U.S. Pat. No. 6,174,842 to Gatto et al. Applicant respectfully traverses for at least the following reasons.

The present invention generally relates to lubricant compositions containing a molybdenum source, a hydroxy-substituted dithiocarbamate, and optionally, a phosphorous source (e.g., instant specification; page 4, lines 5-7). The compositions of this embodiment of the present invention beneficially can provide improved wear protection in engine oils, especially those containing reduced levels of phosphorus. As explained in the instant specification, phosphorus content in prior engine oils has been attributable to the addition of zinc dithiophosphates (ZDDP's) used to prevent engine wear and control oxidation (page 3, lines 4-18). However, contaminants, such as phosphorus, may deactivate emission control systems. Reducing the level of phosphorus in engine oils has been suggested as a means of prolonging the efficiency of the catalytic converter.

Among other things, this invention solves the problem of how to maintain or improve wear-and oxidation-inhibition performance of an engine lubricant at reduced phosphorus levels. Among other things, Applicant has discovered that increased wear protection and oxidation control can be obtained by the co-presence of a molybdenum source and a hydroxy-substituted dithiocarbamate in lubricants containing reduced levels of phosphorus. These improved results are unexpected and surprising. Applicant has already made objective evidence of record in the instant specification showing these improved effects and properties of the compositions of the invention, as will be discussed in more detail below.

In the Office Action, the Examiner is understood to take the position that Luciani et al. teach lubricant oil compositions and so forth comprising at least hydroxyalkyl dithiocarbamate, and that the formulated lubricants containing that ingredient have improved anti-wear and extreme pressure properties. The Examiner is further understood to contend that Luciani et al. teach the use of other additives together with the hydroxy dithiocarbamate including other

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extreme pressure and anti-wear agents, and that the additives *may* also include solid lubricants such as molybdenum disulfide. The Examiner further urges that the secondary references to Gatto et al., Ward, Jr. and Becker teach various molybdenum compounds known in the lubricant field as being conventional extreme pressure/anti-wear additives. The Examiner's stated position is that "... the claimed invention would be obvious to one of ordinary skill in the art because combining two or more materials disclosed by the prior art for the same purpose has been held to be a *prima facie* case of obviousness" (Office Action, page 3).

Applicant points out that Luciani et al. nowhere specifically exemplifies or describes an actual combination of a hydroxyalkyl dithiocarbamate and molybdenum source in an *oil-based* lubricant composition.

Instead, Luciani et al. describe *aqueous compositions* with an *aqueous* phase containing at least one hydroxyalkyl dithiocarbamate, and functional additives which *may* also be included in such *aqueous* systems. The functional additives that Luciani et al. describe that *may* be included in such *aqueous compositions* may include certain solid lubricants such as molybdenum disulfide, amongst other listed alternatives thereof (see col. 28. lines 38-48 and col. 30, lines 36-53).

Luciani et al. separately describe combinations of a hydroxyalkyl dithiocarbamate and at least one phosphorus or boron containing antiwear/extreme agent in *oil-based fluids* (see col. 17, line 56 et seq.). However, the Luciani et al. reference never indicates nor suggests that the molybdenum compound lubricant mentioned at col. 30, lines 51-52 in the context of the *aqueous* systems may also be used in the separately described *oil-based fluids* that contain hydroxyalkyl dithiocarbamate.

As can be appreciated, Luciani et al. do not identically describe nor suggest the combination of instant claim 1 reciting an *oil-based* lubricant composition comprising a hydroxy-substituted dithiocarbamate and a molybdenum source, nor the optional further inclusion of a phosphorus source.

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Moreover, there is no bona fide support in the relied upon prior art for the contention made in the Office Action that the molybdenum compound lubricant optionally used in *aqueous* systems described by Luciani et al. has the "the same purpose" as the hydroxyalkyl dithiocarbamate as used in the *oil-based* fluids separately described by Luciani et al., given the fundamental difference in the nature of the fluids in which they would find use.

The secondary references to Gatto et al, Ward, Jr. and Gatto fail to compensate for this deficiency and shortcoming of the primary reference. The secondary references to Gatto et al. and Ward, Jr. appear to describe certain molybdenum compound usage in oil-based lubricants for oxidation and deposit control in the instance of the Gatto et al.; and anti-wear, extreme pressure properties and so forth in the instance of Ward, Jr. The other secondary reference, Becker, nowhere describes any conventional additive function for the molybdenum compounds taught therein in the context of lubricants. Becker clearly is not relevant or applicable in the manner proposed in the Office Action.

None of the relied upon secondary references suggest combining a molybdenum compound together with a hydroxy-substituted dithiocarbamate in lubricant compositions, much less suggest any possible advantages that might arise from that particular combination. As noted, the primary reference, Luciani et al., only suggests the possibility of including hydroxyalkyl dithiocarbamates and optionally molybdenum disulfide in *aqueous* systems, not oil-based lubricants. The secondary references are not understood to describe or suggest molybdenum compound usage for any purpose in aqueous systems such as the type(s) described by Luciani et al.

There is no bona fide teaching identified in the relied upon prior art that might have motivated one ordinary skill to have considered using any of the purported "extreme-pressure" or "anti-wear"-imparting molybdenum compounds described in any of the secondary references in lieu of the molybdenum disulfide compound that Luciani et al. teach may be combined with hydroxyalkyl dithiocarbamates in *aqueous* systems.

As can be appreciated, and contrary to the contention made in the Office Action, the purported "extreme pressure/antiwear" type molybdenum additives described in any of the secondary references are not used for the same purpose to which Luciani et al. put the hydroxyalkyl dithiocarbamates (when a molybdenum disulfide lubricant compound may be co-present), because their respective use environments diverge and differ (i.e., aqueous vs. oil-based).

Instant claim 26 recites a lubricant composition comprising a hydroxy-substituted dithiocarbamate, a molybdenum source, *and* a phosphorus source. None of the relied upon primary nor secondary references teach or suggest that presently claimed three-way component combination in a single lubricant composition. One of ordinary skill in the art would not have been motivated to consider including a molybdenum disulfide additive specified for use (if used at all) in *water-based* fluid systems containing hydroxylalkyl dithiocarbamate, per Luciani et al., in a completely different system of *oil-based* fluids that include hydroxy-substituted dithiocarbamate and phosphorus.

In view of at least the above, Applicant submits that no prima facie case of obviousness has been established against the instant claims.

Regarding instant claims 38-40, 42, and 44-49 in particular reciting specific hydroxy-substituted dithiocarbamate compounds or lubricating compositions containing a specific hydroxy-substituted dithiocarbamate compound, Applicant submits that the rejection of these claims is improper because the Office Action provides no sufficient explanation of the structural prima facie obviousness of the recited compounds with reference to any specific hydroxy-substituted dithiocarbamate compounds that may be described in the relied upon prior art.

For sake of argument only, even if a prima facie case of obviousness had been established against the rejected claims based on the relied upon references (a contention to which Applicant disagrees for at least the reasons explained above), Applicant has already presented objective probative evidence in the instant specification setting forth unexpected results and properties of the presently claimed compositions sufficient to rebut any such prima facie case of obviousness.

For instance, referring to Table 1 at pages 31-32 of the instant specification, the wear control data presented shows that combining a molybdenum compound and a hydroxy-substituted dithiocarbamate in oil samples containing reduced levels of phosphorus (500 ppm instead of standard 1000 ppm) yielded significantly reduced wear (as measured in terms of Four-Ball Wear Scar) as compared to comparison oil samples that used twice the level of hydroxy-substituted dithiocarbamate but without any molybdenum compound (e.g., see inventive oil sample 10 vs. comparison sample 5; inventive oil sample 19 vs. comparison sample 14; inventive oil sample 28 vs. comparison sample 23; inventive oil sample 37 vs. comparison sample 32).

Referring to Table 2 at pages 36-37 of the instant specification, the oxidation stability data presented shows that combining a molybdenum compound and an hydroxy-substituted dithiocarbamate in oil samples containing reduced levels of phosphorus (500 ppm again) yielded significantly improved oxidative stability (as measured in terms of PDSC Onset Temp.) as compared to comparison oil samples that used twice the level of hydroxy-substituted dithiocarbamate but without any molybdenum compound (e.g., see inventive oil sample 10 vs. comparison sample 5; inventive oil sample 19 vs. comparison sample 14; inventive oil sample 28 vs. comparison sample 23; inventive oil sample 37 vs. comparison sample 32).

These objective wear and oxidation stability data described in the instant specification specifically rebut the contention made in the Office Action that it would have been *prima facie* obvious to combine two or more materials, insofar as the hydroxy-substituted dithiocarbamate and the molybdenum compound, that are allegedly disclosed by the prior art for the same purpose to form a third material.

Again, the objective data in the specification shows, among other things, that the molybdenum compound/hydroxy-substituted dithiocarbamate combinations significantly outperformed any results obtained from merely using the hydroxy-substituted dithiocarbamate alone in much larger amounts. The significantly improved results achieved by the combination would not have been within the expectations of one of ordinary skill in the art.

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In view of the above, Applicant respectfully requests reconsideration and withdrawal of the rejection. Applicant requests that a timely Notice of Allowance be issued in this case.

If the Examiner believes that a teleconference would be useful in expediting the prosecution of this application, the official is kindly invited to contact Applicants' undersigned representative of record.

Respectfully submitted,

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